LEAD OCCUPATIONAL EXPOSURE

29 CFR 1910.1025

Chronology of Lead

Rulemaking

- In 1978, OSHA issued ***Lead Standard for General Industry (29 CFR 1910.1025 "Lead")***
- In 1993, OSHA issued "***Lead Exposure in Construction; Interim Final Rule"(29 CFR 1926.62)***
- Extended same protection provided by General Industry Standard to construction workers
- Standards are very similar

Final Rule Provisions

- Scope
- Definitions
- Permissible Exposure Limit
- Exposure Monitoring
- Methods of Compliance
- Respiratory Protection
- Protective Work Clothing & Equipment
- Housekeeping
- Hygiene Facilities & Practices
- Medical Surveillance
- Medical Removal Protection
- Employee Information & Training
- Signs
- Recordkeeping
- Observation of Monitoring
- Dates
- Appendices

Jobs where you may be exposed to Lead

- Welding & Cutting
- Abrasive Blasting
- Sandblasting/Equipment Cleaning
- Sanding & Grinding on painted surfaces
- Maintenance Employees
- Soldering

Permissible Exposure Limit

Paragraph (c)

- 8 hour time weighted average (TWA) permissible exposure limit (PEL) of ***50 micrograms per cubic meter of air (μg/m³)***
- PEL is adjusted according to workshift

Action Level (AL)

- 8 hour time weighted average (TWA)- action level of ***30 micrograms per cubic meter of air (µg/m³)***

Exposure Monitoring
Paragraph (d)

- **Employer requirements**:
  - determine if lead is present in workplace in ***any quantity***
  - make **Initial Determination** to see if any employee is exposed ***above action level***
  - Employee Exposure - exposure **which would occur *without use of respirator***

Exposure Monitoring

- **How is this done?**
- **Initial Monitoring**: must include instrument monitoring of air
- must cover exposure of **representative** # of employees who have ***highest exposure levels***
- may use previous sampling results ***taken within past*** year

Exposure Monitoring

- must consider symptoms/ information/ observations which ***indicate*** employee exposure to lead as part of initial determination
- **Positive Initial Exposure Determination** requires employer to:
- set up ***Air Monitoring Program***
- determine ***exposure level*** of ***every*** employee

Exposure Monitoring

- **Employee notification** - must be notified in writing of ***air monitoring results*** (& corrective actions) within 5 days of receipt
- Results - exposure over AL but below PEL- monitor ***every 6 months***
- Exposed **over the PEL** - repeat air monitoring ***every 3 months***
- Stop monitoring - if 2 consecutive measurements*,* (taken 2 weeks apart) ***are below AL***

Exposure Monitoring

- Additional monitoring required when:
  - Production, process, personnel change - resulting in new or additional Pb exposure
- Accuracy of measurement
  - of not less than +/- 20% for airborne conc. equal to or greater than 30 ug/m^3 (AL)

Methods of Compliance

Paragraph (e)

- **Engineering and Work Practice Controls -**required when employee exposed to lead ***above PEL*** for ***> 30 days per year***
- **Mechanical ventilation**
- **Glove box, Sandblast Booths**
- **Administrative Controls** - such as ***job rotation*** or ***workshift limits*** are permissible
- **Written Compliance Program** - must be established

Respiratory Protection
Paragraph (f)

- **Respirators:**
- When are they ***required***?
- Your exposure to lead is ***not*** controlled below the PEL ***by other means***
- Whenever you ***request*** one
- Medical advice
- Concern about ***adverse reproductive effects***

Respiratory Protection

- ***No cost*** to employee
- Can obtain a PAPR ***on request***
- **Respiratory Protection Program** required - must include procedures for ***proper selection, cleaning, storage, maintenance***
- Qualitative/Quantitative fit tests- required every 6 months

Protective Work Clothing & Equipment Paragraph (g)

- **Coveralls or similar full-body work clothing** - required for employees ***exposed above the PEL***
- may include gloves, shoes, goggles, face shields, hats
- provide ***clean, dry protective clothing weekly***

Protective Work Clothing & Equipment

- Exposures > 200ug/m^3 - ***provide clothing daily***
- Employer provides:
- ***equipment***
- ***repairs***
- ***replacement***
- ***cleaning, laundering, disposal***

Protective Work Clothing & Equipment

- **Contaminated work clothing**:
- remove in ***change rooms only***
- don't wear home
- clothing to be cleaned, laundered, or disposed of - place in ***closed* containers** in change rooms

Housekeeping
Paragraph (h)

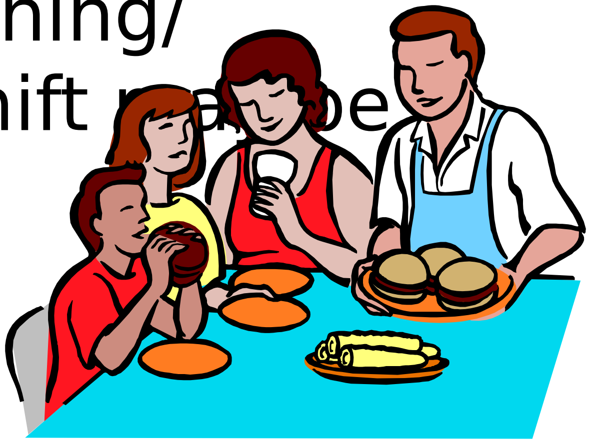
- Establish a **Housekeeping Program**
- Compressed air - ***Prohibited!***
- ***HEPA filter vacuum*** - should be used
- Dry or wet sweeping, shoveling, brushing ***prohibited***

Hygiene Facilities & Practices
Paragraph (i)

- **Provide** change rooms, showers, and filtered air lunch rooms for workers exposed above PEL
- No eating, drinking, applying cosmetics or smoking in work area (only in above)
- ***Wash hands and face*** prior to eating and smoking
- ***Change rooms*** - separate storage for protective / street clothing

Hygiene Facilities & Practices

- Lunchrooms/break areas must be ***separate from work areas***
- Employees entering lunchroom/break area must ***remove surface lead dust*** from protective clothing prior to entrance
- After ***showering*** - no clothing/ equipment worn during shift may be worn home



Medical Surveillance

Paragraph (j)

- Required for all employees - exposed to lead ***at or above action level*** for ***30 or more days*** per year
- ***No cost*** to employee
- Medical surveillance**: 2 parts**
- **Medical examination**
- **Biological monitoring-** blood lead (PbB) and zinc protoporphyrin (ZPP)

Medical Surveillance

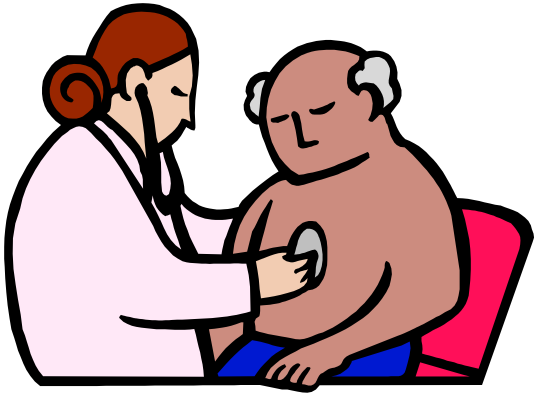
- **Biological monitoring** - required ***every 6 months*** for employees exposed ***above*** action level
- If PbBs > 40 ug/100g:
- monitoring frequency increased to ***every 2 months***
- 5 day notification requirement for test results

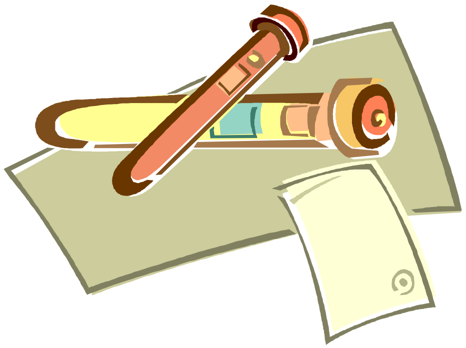
Medical Examinations

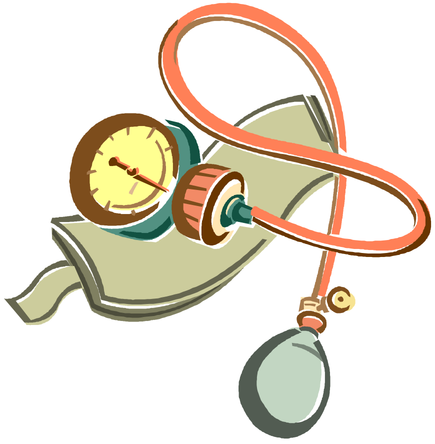
- **When are medical exams given?** yearly, if PbB exceeds 40 ug/100g
- employee assigned ***for first time*** to area where lead exceeds AL
- employee experiences symptoms ***associated with lead poisoning***
- seek advice related to ***reproduction***

Medical Exam Contents

- work history
- medical history
- personal habits
- physical exam
- blood pressure
- blood sample
- urinalysis







Medical Removal Protection

Paragraph (k)

- Employee - ***removed from work area*** if blood lead level is ***at or above 50 ug/100 g***
- Return PbB - at or below 40 ug/100 g
- Employee may ***not*** be penalized

Lead Training

Paragraph (l)

- **Required** for all employees exposed ***at or above the action level***
- Employees who suffer skin & eye irritations from lead
- Training required *least* ***annually***

Lead Training Contents

Paragraph (l)

- Contents of Standard
- Operations of exposure > AL
- Respirators
- Medical Surveillance
- Health Hazards
- Compliance Plan
- Chelating Agents (EDTA)

Signs and Labels

Paragraph (m)

The employer shall post the following signs where the ***PEL is exceeded***

- WARNING
- LEAD WORK AREA
- POISON
- NO SMOKING OR EATING

Recordkeeping
Paragraph (n)

- **Complete records -** shall be kept for ***40 years or employment plus 20 years*** *which ever is longer*
- **Records -** shall be ***provided upon request*** to employee or designated representative

Observation of Monitoring

Paragraph (o)

Employees or their designated representative (union) may observe any monitoring of employees

Effective Dates

Paragraph (p)

This standard became effective March 1, 1979

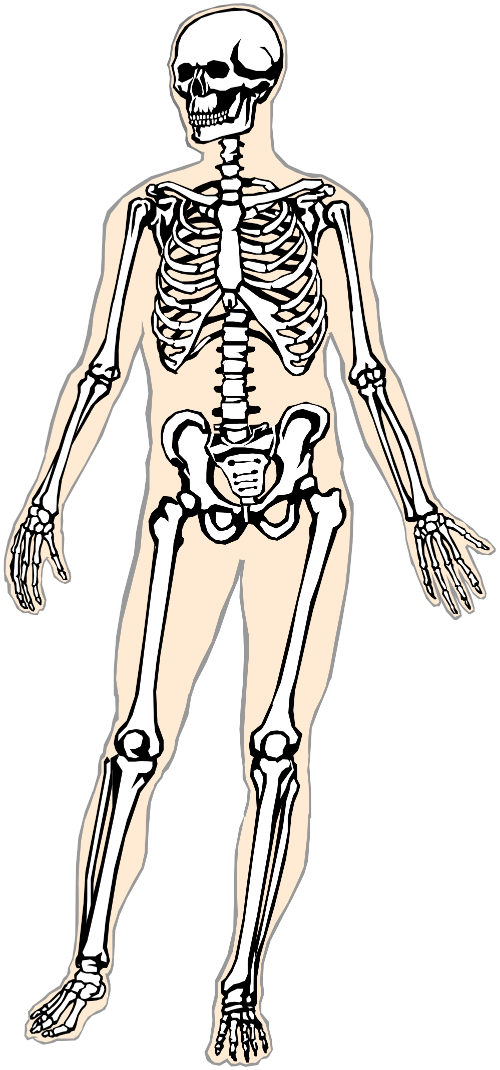
Appendices

Paragraph (q)

- Appendix A - Substance Data Sheet for Lead
- Appendix B - Employees Standard Summary
- Appendix C - Medical Surveillance Guidelines
- Appendix D - Qualitative Fit Test Protocols

Lead Health Hazards
Appendix A

- **Routes of entry**
  - ***Inhalation*** - most common
  - ***Ingestion***
  - ***Skin absorption*** - rare
- **Similar properties to Calcium**
- **90% body burden found in bone & teeth - 1/2 life 27 years**
- **10% in the kidneys & liver**



Lead Health Hazards
Appendix A

- ***Short term (acute) overexposure***
  - **Acute**
    - anemia, vomiting
    - metal fume fever
    - more common in children
    - easier to diagnose
    - treated by chelation
  - ***Severe* poisoning is rare**
    - encephalopathy - seizures, coma, possible death

Lead Health Hazards

Appendix A

- ***Long term (chronic) overexposure***
- ***Lead is a cumulative poison***
- ***Systemic poison - no known useful function***
  - **Symptoms:** loss of appetite, metallic taste, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain, numbness, dizziness

Lead Health Hazards

- Central Nervous System (CNS)
- Lead often doesn’t produce any physical symptoms
  - memory loss
  - slow reaction time
  - lower intelligence
  - shorten attention span
  - paralysis - “wrist drop”

Lead Health Hazards

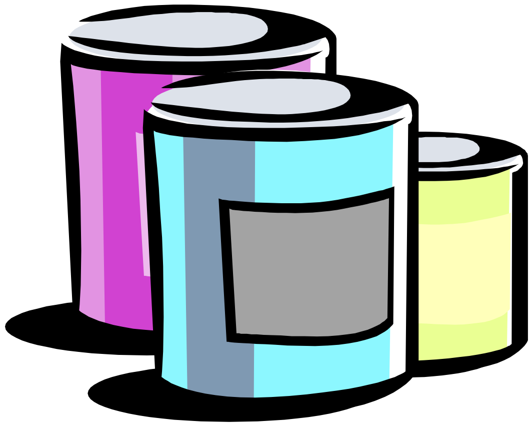
- Blood System
  - anemia
  - red blood cell defects
- Kidneys
  - most important route for excretion
- Reproductive System
  - both men & women

Lead Health Hazards

- **Lead and children**
  - Small amounts ***very toxic***
  - Can cause developmental problems & learning disabilities
  - ***Ingestion*** is the most common route of entry
  - Children absorb about 50% & retain about 30%
  - Adults absorb about 5-15% & retain <5%

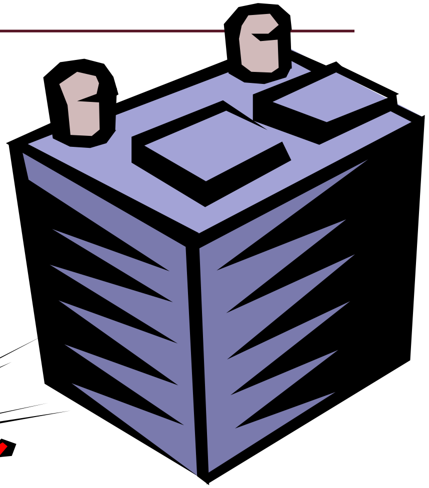
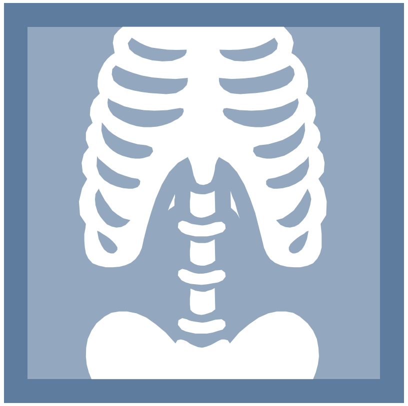
Lead Sources

- 60% of adult exposure is from food
  - food should be washed prior to cooking
  - food cans manufactured in U.S. lead-free
- 30% is from air inhalation
- 10% is from water



Non-Occupational Exposure

- recreational shooting on indoor ranges
- pottery making
- jewelry making
- gunsmithing
- glass polishing
- stained glass crafting
- painting

Other Uses/Industries

- storage batteries
- detonator for explosives
- dyes
- insecticides
- sound dampening
- x-ray shielding
- match heads